REMARKS

Claims 1-26 were presented for Examination, of which claims 1, 9, 15, and 23 are independent. Applicants amend claims 1, 4, 7, and 23 herein. Further, Applicants cancel claims 2-3, 5-6, 8-22, and 24-26 without prejudice or disclaimer, and add new claims 27-47. After entry of this Amendment, claims 1, 4, 7, 23, and 27-47 will be pending, of which claims 1, 23, and 34 are independent.

Amendments to the Claims and New Claims

Claims 1, 4, 7, and 23 have been amended herein to more accurately claim the invention. Support for these amendments can be found throughout the Application, and more specifically at pages 12-16, and Figures 1, 2, 4A, 4B, 5, and 6. No new matter is added by these amendments.

New independent claim 34 is a method claim corresponding to medium claim 23. New dependent claims 27-33 depend from claim 23, and new dependent claims 35-47 depend from claim 34. The new dependent claims recite subject matter formerly found in the canceled dependent claims, with the exception of claims 45-47. Support for new claims 42-44 can be found in Figures 4A, 4B, 6, 7, and 10, and at pages 13-14. No new matter is added.

Claim Objections

The Examiner objects to claim 19 for informalities. Claim 19 is canceled herein, and thus Applicants respectfully submit that the objection to claim 19 is moot.

Claim Rejections under 35 U.S.C. §102(e)

Claims 1-3, 5-10, 12-20, and 23-26 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application No. 2003/0026271 to Erb et al. (hereafter "Erb"). Applicants respectfully traverse the rejection.

The Claimed Invention

The claimed invention is directed to communications in a virtual hierarchical local area network (Application at Abstract). The hierarchy is formed by tiered data link layer addressing, resulting in a series of "tiers" in the network hierarchy (Application at page 2, lines 3-5). Figure 6 of the present Application shows an example of such a network hierarchy. In Figure 6, communications between host devices 12A-12D and network devices 16A-16D represent the "first tier" in the network hierarchy (Application at page 16, lines 25-27). Communications between network devices 16A-16D represent the "second tier" in the network hierarchy (Application at page 16, lines 27-28). Network device 19 is considered a layer two network device that is able to understand and communicate with another network device in a data link layer protocol (Application at page 16, lines 30-32).

Conventionally, adding a new "sub-network" to a network can lead to scalability problems. In order to properly forward packets to a host device, the network devices maintain an address table that contains information about the known addresses of other devices in the network (Application at page 14, lines 13-27). Adding new devices to a network causes the size of these address tables to increase exponentially, which makes scaling the network difficult, and memory- and processor- intensive.

For example, if a new network device is initially connected into a conventional network, the new network device may connect a number of host devices to the network. With these new host devices present in the network, the address tables of the existing network devices would be updated to include the address information of the new host devices. If, for example, the new network device connects five new host devices with five new addresses into the network, the address tables of the existing network devices would grow by at least five to account for the new addresses.

It is also possible that further "sub-networks" are present below the new network device. If, instead of connecting five new host devices into the network, consider what occurs if the new network device connects five new *sub-networks*, each "below" the new network device, into the network. If each *sub-network* has five devices, then the existing network devices must update their address tables to include the new *twenty-five* host devices. Increasing this to a third level of

sub-networks (e.g., each of the twenty-five host devices in the above example represents its own sub-network connecting five devices each) would mean that *one hundred and twenty five* host devices are added. Further sub-networks below each of the network devices may cause the number of host devices to grow *exponentially*; thus, the address table that each of the existing network devices maintains will also grow exponentially. This is so because the address tables of the network devices contain information related to many of the different devices in the network. As a result, it becomes increasingly difficult to scale up the number of devices in the network.

The present invention solves this problem by creating a hierarchical address scheme. By encapsulating a frame from the first tier in a second frame, many host device addresses may be represented by a single address (see pages 8-9 of the Application). The network devices then only need to maintain information about that single address in their address tables in order to effectively communicate with all of the sub-networks below the network device associated with the single address. In this way, the network devices may "ignore" the devices below their own tier in the hierarchy, and need only concern themselves with the addition of a network device *at their own tier.*

Because of this, when a new network device is added to the network, the existing network devices only need to update their address tables with a single new value (see page 14 of the Application). Thus, the size of the address table for a given network device increases *linearly* when another network device is added to the network, regardless of how many host devices lie below the new network device. This allows the network to scale up in size simply and without the need to maintain large and unwieldy address tables.

The amended claims more accurately claim the invention. For instance, amended independent claim 1 recites *a processor for updating the address table, wherein the number of entries in the address table increases linearly for each network device with a data link layer address that is associated with the second tier of the network hierarchy added to the network.* Further, the amended claims clarify the meaning of the network hierarchy.

The Cited Prior Art and the Rejection under §102(e)

Claims 1-3, 5-10, 12-20, and 23-26 are rejected under §102(e) as being anticipated by Erb. Erb is generally directed to a Multi-Protocol Label Switched ("MPLS") network (Erb at Abstract). Erb implements an L2/L3 network that supports bridging and routing, but does not require bridge/routers, or the bridging of non-local Protocol Data Units to an external router for routing (Erb at [0005].

Erb is not concerned with the size of the data link layer address table in the network devices, and is silent regarding such an address table. Therefore, Erb does not disclose *updating the address table, wherein the number of entries in the address table increases linearly for each network device with a data link layer address that is associated with the second tier of the network hierarchy added to the network*, which is present in amended independent claims 1 and 23.

Further, amended independent claim 1 recites *the first frame format comprising a first data link layer header* and *a framing mechanism to encapsulate the first frame with a second data link layer header to form a second frame format, the second frame format representing a second tier of data link layer addresses in the network hierarchy*. Thus, the first frame format comprises a first data link layer header (a Layer 2, or "L2," header), and the second frame format comprises a *second* data link layer header (i.e., a second L2 header). In contrast, Erb is inserting an MPLS label, either between an L2 header and a Layer 3 ("L3") header, or is inserting an MPLS label into a L2 header (Erb at [0044]). The MPLS label itself is not a data link layer (L2) header, but rather is considered to be a layer 2.5, or "L2/L3" header (see, e.g., Erb at [0025]). As shown in Figure 4, the frame format includes an L2 header, an L3 header, and an MPLS (L2/L3) header. In contrast, the second frame format of claim 1 encapsulates a frame comprising a *first data link layer header* with a *second data link layer header.*

Similarly, amended independent claim 23 recites *the first frame format having a first data link layer source address and a first data link layer destination address* and *formatting the frame in the first frame format into a second frame format in the electronic device, wherein the second frame format represents a second tier of data link layer addresses in the network*

hierarchy, the second frame format having a second data link layer source address and a second data link layer destination address.

Therefore, Erb does not disclose each and every feature of independent claims 1 and 23. Claims 4 and 7 depend from claim 1, and therefore include each and every patentable element of claim 1. Claims 27-33 depend from claim 23, and therefore include each and every patentable element of claim 23. Thus, Erb does not disclose each and every element of claims 4, 7, and 27-33. Applicants respectfully request that the Examiner withdraw the 35 U.S.C. §102(e) rejection of claims 1, 4, 7, 23, and 27-33, and pass those claims to allowance.

Claims 2-3, 5-6, 8-22, and 24-26 have been canceled. Therefore, Applicants respectfully submit that the §102(e) rejection of these claims is moot.

Claim Rejections under 35 U.S.C. §103(a)

Claims 4, 11, 21, and 22 are rejected under 35 U.S.C. §103(a) as being obvious over Erb in view of U.S. Patent No. 6,331,978 to Ravikanth et al. (hereafter "Ravikanth"). Applicants respectfully traverse.

Ravikanth is generally directed to a combination of MPLS packets with SONET. Although Ravikanth does discuss "encapsulation," Ravikanth does not render claim 4 obvious. Claim 4 depends from claim 1, and therefore includes each and every element of claim 1. As discussed above, Erb does not teach or suggest each and every element of claim 1. The addition of Ravikanth does not cure the factual deficiencies of Erb with respect to claim 1.

For example, Ravikanth does not teach or suggest *updating the address table, wherein the number of entries in the address table increases linearly for each network device with a data link layer address that is associated with the second tier of the network hierarchy added to the network*, which is present in claim 1. Further, Ravikanth does not teach or suggest *the first frame format comprising a first data link layer header,* and *a framing mechanism to encapsulate the first frame with a second data link layer header to form a second frame format, the second*

frame format representing a second tier of data link layer addresses in the network hierarchy, which are present in claim 1.

Therefore, Ravikanth and Erb, alone or in any reasonable combination, do not teach or suggest each and every element of independent claim 1. Claim 4 depends from claim 1, and therefore includes each and every element of claim 1. Thus, Ravikanth and Erb, alone or in any reasonable combination, do not disclose or suggest each and every element of claim 4. Applicants respectfully request that the Examiner withdraw the 35 U.S.C. §103(a) rejection of claim 4, and pass claim 4 to allowance.

Claims 11, 21, and 22 have been canceled. Therefore, Applicants respectfully submit that the §103(a) rejection of these claims is moot.

New Claims 27-47

New independent claim 34 recites features similar to those discussed above in relation to independent claims 1 and 23, and is allowable for at least the same reasons as those claims.

New dependent claims 27-33 depend from claim 23, and are therefore allowable for at least the same reasons as claim 23. New dependent claims 35-47 depend from claim 34, and are therefore allowable for at least the same reasons as claim 34.

In light of the above, Applicants respectfully request that the Examiner pass new claims 27-47 to allowance.

CONCLUSION

In view of the above, Applicants believe that the pending application is in condition for allowance. If the Examiner deems that issues persist, please contact the Applicants' attorney.

Applicant believes no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. ENB-001 from which the undersigned is authorized to draw.

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Respectfully submitted,

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